Generating pluripotent cell lines from neurons.

Grant Award Details

Generating pluripotent cell lines from neurons.

Grant Type: New Faculty I

Grant Number: RN1-00584

Project Objective: Goal of grant is to derive pluripotent cell lines from neural subtypes and determine whether genomic changes accompany neural differentiation, either by accident (instability, breakage) or design (i.e. rearrangement a la immune cells).

Investigator:

Name:	Kristin Baldwin
Institution:	Scripps Research Institute
Type:	PI

Award Value: $2,786,560

Status: Closed

Progress Reports

Reporting Period: Year 2

View Report

Reporting Period: Year 3

View Report

Reporting Period: Year 4

View Report

Reporting Period: Year 5

View Report

Grant Application Details

Application Title: Generating pluripotent cell lines from neurons.

Public Abstract: Stem cell research holds great promise for neurological disease. One in three Americans will suffer from diseases of the nervous system ranging from stroke to Alzheimer's disease to epilepsy. Very few treatments for neurological disease exist, in part because of he lack of suitable in vitro models with which to test therapeutics. In addition, many neuronal disorders, including Parkinson's disease and ALS, are characterized by loss of important subpopulations of neurons. In affected patients, the only way to restore function may be to provide them with replacement neurons. Many researchers are already working on methods to generate replacement neurons from human embryonic stem cells or to generate accurate in vitro models of neurological diseases. Here, we propose to perform the reverse experiment; we aim to generate pluripotent cell lines directly from neurons, using two novel technologies. The first goal of these experiments is to generate cell lines so that we can compare the chromosomes of neurons with those of neurons derived from ES cells. If differences exist, and are important for the proper function of neurons, it is essential to identify these changes. Similarly, if neurons in diseased patients have DNAchanges that cause disease symptoms, it would be better to derive ES cells directly from neurons and then to "re-differentiate " them into better in vitro models for drug screening. Both of these findings will significantly impact the ~ 30% of CIRM funded grants aimed at curing various diseases of the nervous system.

Statement of Benefit to California: The goal of this study is to develop novel techniques to generate stem cell lines directly from neurons, which is currently impossible in humans. Our findings will also allow us to validate or improve current strategies to generate replacement neurons from human embryonic stem cells. Our experiments should suggest new ways to derive patient specific cell lines to treat or study common human neurological diseases such as Alzheimer's and autism. These findings may lead to relief for patients who suffer from currently untreatable diseases of the nervous system. In addition, our novel methods may foster innovation in the dynamic biotechnology and health-care sectors of the California economy, which would benefit many Californians in by creating jobs and promoting economic growth.